## Claims

1. An electronic device manufacturing method, comprising the steps of:

preparing a substrate;

forming, on said substrate, a photosensitive organic film having molecules not polymers as a main component having on the periphery thereof a plurality of polarity change reaction groups for controlling solubility with respect to a developer; and

transferring a hole pattern or a gate pattern to said photosensitive organic film.

2. The electronic device manufacturing method according to Claim 1, wherein said photosensitive organic film includes an acid generation group for generating acid by exposure.

3. The electronic device manufacturing method according to Claim 1, wherein said photosensitive organic film includes a thermal cross-linker, which is heat treated after said pattern has been transferred.

4. An electronic device manufacturing method, comprising the steps of:

preparing a substrate;

forming, on said substrate, a photosensitive organic film having molecules not polymers as a main component for embracing or connecting at least part of acid generation

molecules including an acid generation group, including four or more reaction sites which are polarity change reaction groups for controlling solubility with respect to a developer; and

transferring a hole pattern or a gate pattern to said photosensitive organic film.

5. The electronic device manufacturing method according to Claim 4, wherein said acid generation group includes a phenyl group.

6. The electronic device manufacturing method according to Claim 4, wherein said transferring is carried out using an energy beam having a wavelength of 193 nm or less.

7. The electronic device manufacturing method according to Claim 4, wherein said photosensitive organic film is heat treated while ultraviolet light or an electron beam is emitted after said pattern has been transferred.

8. The electronic device manufacturing method according to Claim 4, wherein said photosensitive organic film includes a thermal cross-linker, and is heat-treated after said pattern has been transferred.

9. The electronic device manufacturing method according to Claim 4, wherein said photosensitive organic film is developed using a super critical fluid after said pattern has been transferred.

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according to Claim 4, wherein a plurality of said polarity change reaction groups are provided on the periphery of said molecules not polymers.

11. The electronic device manufacturing method according to Claim 4, wherein said molecules not polymers includes, as main constituting elements, at least one of cyclodextrine, calixarane, multi-nuclear phenol, dendrimer, fullerene, crown ether, androsteron, and silicon monomer-oligomer, or one of the induction elements thereof.

12. An electronic device manufacturing method, comprising the steps of:

preparing a substrate;

forming, on said substrate, a photosensitive organic film which includes an acid generation group for generating acid by exposure, and molecules not polymers whose molecular weight is 5000 or less being main components, a plurality of said groups being provided on the periphery of said molecules, and which controls solubility with respect to a developer by de-oprotectiion reaction of a hydroxy group protected by a protection group; and

transferring a predetermined pattern to said photosensitive organic film using an energy beam having a wavelength of 193 nm or less.

13. The electronic device manufacturing method according to Claim 12, wherein said predetermined pattern is a hole pattern or a damacin wiring pattern.

14. The electronic device manufacturing method according to Claim 12, wherein at least part of an acid generation molecule including said acid generation group is made clathrate or combinatory to said molecules not polymers.

15. The electronic device manufacturing method according to Claim 12, wherein said acid generation group includes a phenyl group.

16. The electronic device manufacturing method according to Claim 12, wherein said molecules not polymers includes, as main constituting elements, at least one of cyclodextrine, calixarane, multi-nuclear phenol, dendrimer, fullerene, crown ether, androsteron, and silicon monomer-oligomer, or one of the induction elements thereof.

17. An electronic device manufacturing method, comprising the steps of:

preparing a substrate;

forming, on said substrate, a photosensitive organic film which includes an acid generation group for generating acid by exposure, molecules not polymers whose molecular weight is 5000 or less being a main component, and which carries out control of solubility with respect to a developer by lactone forming reaction at a plurality of reaction sites provided on the periphery of said mother nuclear molecules or pinacol transition reaction; and

transferring a predetermined pattern to said

photosensitive organic film using an energy beam having a wavelength of 193 nm or less.

18. The electronic device manufacturing method according to Claim 12, wherein said predetermined pattern is a gate pattern or a wiring pattern.

19. The electronic device manufacturing method according to Claim 17, wherein at least part of an acid generation molecule including said acid generation group is made clathrate or combinatory to said molecules not polymers.

20. The electronic device manufacturing method according to Claim 17, wherein said acid generation group includes a phenyl group.

21. The electronic device manufacturing method according to Claim 4, wherein said molecules not polymers includes, as main constituting elements, at least one of cyclodextrine, calixarane, multi-nuclear phenol, dendrimer, fullerene, crown ether, androsteron, and silicon monomer-oligomer, or one of the induction elements thereof.

22. An electronic device manufacturing method, comprising the steps of:

preparing a substrate formed with a dielectric film;

forming, on said substrate formed with the dielectric film, a photosensitive organic film which subjects at least part of an acid generation molecule including an acid generation group to clathrate or

combination, and which has a polarity change reaction group for controlling solubility with respect to a developer, and molecules having a defined molecular weight of 5000 or less;

transferring a predetermined pattern to said photosensitive organic film; and

etching said dielectric film with said photosensitive organic films used as a mask to form an opening pattern.

23. An electronic device manufacturing method, comprising the steps of:

preparing a substrate formed with a metal film a semiconductor film;

forming, on said substrate formed with a dielectric film, a photosensitive organic film which subjects clathrate or combination at least part of an acid generation molecule including an acid generation group to clathrate or combination, and which has a polarity change reaction group for controlling solubility with respect to a developer, and molecules having a defined molecular weight of 5000 or less being a main component;

transferring a predetermined pattern to said photosensitive organic film; and

etching said metal film or semiconductor film with said photosensitive organic films used as a mask to leave an island-like pattern.

24. An electronic device manufacturing method, comprising the steps of:

preparing a substrate;

forming, on said substrate, a photosensitive organic film which subjects at least part of an acid generation molecule including an acid generation group to clathrate or combination, being smaller in dimension than the width of a transition region in which probability for acquiring solubility changes from 0.1 to 0.9, and which has, as a main component, molecules having a defined molecular weight and including a reaction site which is a polarity change reaction group for controlling solubility with respect to a developer; and

transferring a hole pattern or a gate pattern to said photosensitive organic film.

25. An electronic device manufacturing method, comprising the steps of:

preparing a substrate;

forming, on said substrate, a photosensitive organic film which subjects at least part of an acid generation molecule including an acid generation group to clathrate or combination, and which, as main components, molecules having a defined molecular weight of 5000 or less including a reaction site which is a polarity change reaction group for controlling solubility with respect to a developer, and

transferring a hole pattern or a gate pattern to

said photosensitive organic film.

26. An electronic device manufacturing method comprising the step of:

forming a pattern by using a radio sensitive chemical compound which includes an acid generation group that generates an acid catalyst by irradiation of radiation, and which has, as main components, molecules having a defined molecular weight of 5000 or less including four or more defined reaction groups which generates a polarity conversion reaction by said acid catalyst;

wherein an average distance (a reciprocal of cube root of reaction group concentration) between said reaction groups is 1% or less of the minimum dimension of the pattern formed on said substrate, and an average distance (a reciprocal of cube root of acid generation group concentration) between acid generation groups which generates said acid catalyst by irradiation of radiation is 3% or less of said minimum dimension.

27. An electronic device manufacturing method, comprising the step of:

forming a pattern by using a radio sensitive chemical compound which includes four or more defined reaction groups which generate a polarity conversion reaction by an acid catalyst, and an acid generator having, as main components, molecules having a defined molecular weight of 5000 or less, and a weight ratio of 10% or more.

28. An electronic device manufacturing method comprising the step of:

forming a pattern by using a radio sensitive chemical compound which includes an acid generation group generating an acid catalyst by irradiation of radiation, and, as main components, molecules having a defined molecular weight of 5000 or less including four or more defined reaction groups generating a polarity conversion reaction by an acid catalyst;

wherein an acid generator molecule including said acid generation group is made clathrate in said molecule, or said acid generation group is combined to said molecules.

29. The electronic device manufacturing method according to any one of Claims 26 to 28,

wherein said molecule is cyclodextrine, calixarane, multi-nuclear phenol, dendrimer, fullerene, crown ether, androsteron, or induction elements of silicon monomer-oligomer.

30. The electronic device manufacturing method according to any one of Claims 26 to 28,

wherein said polarity conversion reaction is a reaction changing a polarity from hydrophilic to hydrophobic by lactone forming reaction caused by an acid catalyst reaction, or a carbinol molecule de-watering reaction such as pinacol transition.

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according to any one of Claims 26 to 28,

wherein said polarity conversion reaction is a reaction changing a polarity from hydrophilic to hydrophobic by de-protection reaction of a hydroxyl group protected and displaced by a non-polarity protection group by an cid catalyst reaction.

32. An electronic device manufacturing method in which a pattern is formed on a substrate by carrying out development after a patterned radiation is applied to a radio sensitive chemical compound thin film formed on the substrate,

wherein said radio sensitive chemical compound is a radio sensitive chemical compound having, as main component, molecules having a defined molecular weight of 5000 or less including a reaction group generating a polarity conversion reaction by an acid catalyst; and

wherein an average distance (a reciprocal of cube root of acid concentration) between acid catalysts generated by the irradiation of radiation is 5% or less of the minimum dimension, and a diffusion length internally of the radio sensitive chemical compound thin film from the irradiation to development of said acid catalyst is 1% or less of the minimum dimension, or the reaction number necessary for changing solubility of one molecule is 4 or more.

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according to Claim 32, wherein said irradiation of radiation is ultraviolet (EUV) beam of wavelength 5 to 15 nm, an electron beam, $F_3$ laser beam or ArF excimer laser beam.

34. The electronic device manufacturing method according to Claim 32, wherein said radio sensitive chemical compound is a negative type in which solubility of an irradiation portion lowers, and a gate pattern of a transistor is formed on said substrate by electron beam reduction projection exposure through a dark field mask in which the area rate of said radiation transmission portion is smaller than that of non-transmission portion, or by ultraviolet (EUV) beam reduction projection exposure through a dark field mask in which the area rate of said radiation reflecting portion is smaller than that of a non-reflecting portion

35. The electronic device manufacturing method according to Claim 32, wherein said radio sensitive chemical compound is a positive type in which solubility of an irradiation portion increases, and a trench pattern for wiring is formed on said substrate by electron beam reduction projection exposure through a dark field mask in which the area rate of said radiation transmission portion is smaller than that of non-transmission portion, or by ultraviolet (EUV) beam reduction projection exposure through a dark field mask in which the area rate of said

radiation reflecting portion is smaller than that of a non-reflecting portion.

36. The electronic device manufacturing method according to Claim 32, further comprising the step of carrying out DUV, EB curing after irradiation of radiation.

37. The electronic device manufacturing method according to Claim 32, further comprising the step of carrying super critical phenomenon after irradiation of radiation.